UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/084,603	05/06/2008	Clark V. Cooper	PA11727; 67097-1259PUS1	1016

54549 7590 04/28/2017

CARLSON, GASKEY & OLDS/PRATT & WHITNEY
400 West Maple Road
Suite 350
Birmingham, MI 48009

EXAMINER	
BOES, TERENCE	

ART UNIT	PAPER NUMBER
3658	

NOTIFICATION DATE	DELIVERY MODE
04/28/2017	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ptodocket@cgolaw.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CLARK V. COOPER,
SONIA TULYANI, EDWARD J. KAREDES,
JEFFERI J. COVINGTON, HARSH VINAYAK,
and ALEXANDER STAROSELSKY

Appeal 2015-006716
Application 12/084,603
Technology Center 3600

Before JAMES P. CALVE, GEORGE R. HOSKINS, and FREDERICK C. LANEY, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from the final rejection of claims 15 and 18–23. *See* Appeal Br. 5. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

CLAIMED SUBJECT MATTER

Claim 15, the sole independent claim, is reproduced below.

> 15. A gear set, comprising:
> a first gear having a first surface; and
> an intermeshing second gear having a second surface,
> wherein the first and second surfaces each, independently, have an arithmetic mean roughness of about 0.0762 micrometers/3 microinches or less, the first surface and the second surface are lubricated with a polyol ester lubricant and the first and second surfaces each have a lambda value of 1.0 to 2.0, the first gear and the second gear having a power density increase for pitting failure of about 52% versus as-ground gears having an as-ground lambda value of about 0.3.

REJECTIONS

Claims 15 and 18–22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshiteru (JP 2000-257697 A, pub. Sept. 19, 2000) and Pafford (US 5,698,502, iss. Dec. 16, 1997).

Claim 23 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshiteru, Pafford, and Philip (US 4,157,258, iss. June 5, 1979).

ANALYSIS

Claims 15 and 18–22 as unpatentable over Yoshiteru and Pafford

Regarding independent claim 15, the Examiner found that Yoshiteru teaches a gear set, as claimed, with an arithmetic mean roughness of about 0.0762 micrometers/3 microinches or less, but does not disclose lubrication by a polyol ester lubricant or a lambda value between 1 and 2. Final Act. 2–3. The Examiner found that Pafford teaches a polyol ester lubricant used for enhanced thermal stability and reasoned that it would have been obvious to provide such a lubricant on Yoshiteru to enhance thermal stability. *Id.* at 3.

The Examiner determined it would have been obvious to use a lambda value between 1 and 2, as claimed, "since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art." *Id.* The Examiner also found that Yoshiteru's gear set is capable of having the claimed power density increase. *Id.* at 2–3. The Examiner also reasoned that the claimed power density increase for pitting failure is merely a property of the claimed invention and not a structural limitation such that the prior art's disclosure of the claimed gear set with the claimed roughness and lubricant structural features leads to this property, which is presumed to be inherent in the prior art. Ans. 5–6.

We agree with Appellants that neither Yoshiteru nor Pafford teaches or suggests that the lambda value (ratio of lubricant film thickness to surface roughness) is a result-effective variable, the value, or adjustment of which is recognized in the prior art as affecting a power density increase or any other attribute such that a skilled artisan would have been motivated to experiment and optimize it in some manner to arrive at the claimed lambda value of 1.0 to 2.0. The Examiner does not cite any evidence to support a determination that it would have been obvious to use a lambda value between 1 and 2. *See* Final Act. 3. The Abstract of Yoshiteru, which is cited by the Examiner to show the claimed surface roughness (Final Act. 2), does not teach anything about a lubricant or lubricant thickness. Pafford teaches the claimed polyol ester lubricant for lubricant applications such as aircraft turbine oils but does not teach thickness or use with gear sets. Pafford, 14:9–11; *see* Final Act. 3.

The Examiner's citation of Biltgen (US 5,549,764, iss. Aug. 27, 1996) (Ans. 9) is not persuasive evidence because it is not applied in the rejection that is under review.

Even considering Biltgen's teachings, Biltgen teaches "[c]ontacts in gears usually operate in the region of mixed-film lubrication where the film thickness to roughness ratio, lambda, is less than three."[1] Biltgen, 1:65–67. Biltgen also teaches that the load is shared between the fluid and asperity contacts, and lubrication behavior is influenced by overall distributions of film thickness, pressure, shear stress, and flash temperature. *Id.* at 1:67–2:6. We agree with Appellants that these disclosures do not teach varying the lubrication film thickness and lambda in order to achieve a power density increase or any other property or result. Reply Br. 2–3.

Biltgen teaches a lambda range of less than three without any teaching of the advantage or efficacy of varying that range for any particular reason. In the event of further prosecution, we note that Biltgen's range of less than three overlaps and encompasses the claimed lambda range of 1.0 to 2.0. This overlap creates a prima facie case of obviousness. *See In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003). Appellants may rebut that showing with evidence of criticality and unexpected results of the claimed range relative to the prior art. *See* Appeal Br. 3; Reply Br. 2.

For all of the foregoing reasons, we do not sustain the rejection of claims 15 and 18–22.

---

[1] The Examiner rejected original claims 1–14 under 35 U.S.C. § 103(a) as unpatentable over Biltgen and Rao, "Repair of Helicopter Gears" and over Biltgen and Yoshiteru. Non-Final Act. (mailed Apr. 5, 2011), at 2–8. Later, the Examiner rejected claims 1–17 on these grounds. Final Act. (mailed Sept. 20, 2011), at 2–10. The Examiner also rejected claims 15–22 on these grounds after Appellants cancelled claims 1–14. *See* Non-Final Act. (mailed Feb. 1, 2012), at 2–7. When Appellants amended independent claim 15 to recite lubrication "with a polyol ester lubricant," the Examiner switched the grounds of rejection to Yoshiteru and Pafford as we consider on this appeal. *See* Final Act. (mailed May 23, 2012), at 2–4.

Claim 23 as unpatentable over Yoshiteru, Pafford, and Philip

Appellants argue that the Examiner's reliance on Philip to teach the features of claim 23 does not cure the deficiencies of Yoshiteru and Pafford as to claim 15, from which claim 23 depends. *See* Appeal Br. 4. We agree. Thus, we do not sustain the rejection of claim 23.

DECISION

We reverse the rejections of claims 15 and 18–23.

REVERSED